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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------|------------------|
| 10/522,874  | 02/02/2005  | F. Bruce Thigpen     | 14958NP             | 7316             |
| 293   | 7590        | 10/19/2006           | EXAMINER            |                  |
| Ralph A. Dowell of DOWELL & DOWELL P.C.<br>2111 Eisenhower Ave<br>Suite 406<br>Alexandria, VA 22314 |             |                      | SAUNDERS JR, JOSEPH |                  |
|   |             |                      | ART UNIT            | PAPER NUMBER     |
|   |             |                      | 2615                |                  |

DATE MAILED: 10/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |                     |  |
|------------------------------|------------------------|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> | <b>Applicant(s)</b> |  |
|                              | 10/522,874             | THIGPEN, F. BRUCE   |  |
|                              | <b>Examiner</b>        | <b>Art Unit</b>     |  |
|                              | Joseph Saunders        | 2615                |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 02 February 2005.
- 2a) This action is FINAL.                            2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) Claim(s) \_\_\_\_\_ is/are allowed.
- 6) Claim(s) 1-10 is/are rejected.
- 7) Claim(s) \_\_\_\_\_ is/are objected to.
- 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 02 February 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All    b) Some \* c) None of:
  1. Certified copies of the priority documents have been received.
  2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

|   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | Paper No(s)/Mail Date. _____.                                     |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>02 February 2005</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application |
|   | 6) <input type="checkbox"/> Other: _____.                         |

**DETAILED ACTION**

1. This is the initial office action based on the application filed February 2, 2005.

Claims 1 – 10 are currently pending and considered below.

***Specification***

2. The abstract of the disclosure does not commence on a separate sheet in accordance with 37 CFR 1.52(b)(4). A new abstract of the disclosure is required and must be presented on a separate sheet, apart from any other text.

3. The disclosure is objected to because of the following informalities: On page 5 line 10 of the specification the word "of" should be corrected to "the". On page 6 line 18 the phrase "force is that created" should be corrected to "force that is created".

Appropriate correction is required.

4. The use of the trademark MYLAR, KAPTON, KALADEX, TEFZEL, TEFLON, NYLON and LYCRA has been noted in this application. It should be capitalized wherever it appears and be accompanied by the generic terminology.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 4, 6, and 8 – 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 6 and 10 state that the ultimate elongation of the composite diaphragm within the frame is non-uniform across its surface, but the specification does not disclose how the ultimate elongation is made non-uniform across its surface within the frame. It is also unclear to the examiner if the applicant is using the correct term when they state that it is the ultimate elongation of the material that causes the desired results and not what is commonly referred to as the percent elongation of the material. For examination purposes the examiner will interpret the limitation of having the ultimate elongation of the composite diaphragm within the frame non-uniform across its surface to be the case where the tension of the diaphragm within the frame is non-uniform across the surface as a result of the diaphragms interaction with the frame. Claims 4, 6, and 8 – 10 state that the composite diaphragm moves in a piston-like manner however the specification does not disclose how the ultimate elongation of the material is responsible for the piston-like motion. The applicant also contradicts himself, when comparing statements made in the provisional application to the pending application. In the provisional application with regards to figure 2 the applicant states, "Test results show that where the diaphragm substrate compliance is less than .5 times the

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compliance of the foil adhered to the substrate material, distortion is greatly reduced."

And in the pending application with regards to figure 2 the applicant this time states,

"Test results show that where the diaphragm substrate compliance is greater than the

compliance of the metallic material or foil 30 adhered to the substrate material, and

preferably when the ultimate elongation of the film substrate is greater than

approximately 40 times that of the metallic material, distortion is greatly reduced." This

further leads the examiner to believe that the ultimate elongation may not be the correct

mechanical property of the material responsible for the desired results, however for

examination purposes the examiner will interpret the claims in a manner that any of the

preferred films disclosed in the specification will result in piston-like motion of the

diaphragm. The examiner will also interpret piston-like motion to include bending wave

motion since it is unclear as to how piston-like motion is achieved in this case and a

clear distinction between piston-like motion and bending wave motion is not made.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claim 3 contains the trademark/trade names TEFZEL, TEFLON, NYLON and

LYCRA. Where a trademark or trade name is used in a claim as a limitation to identify

or describe a particular material or product, the claim does not comply with the

requirements of 35 U.S.C. 112, second paragraph. See Ex parte Simpson, 218 USPQ

1020 (Bd. App. 1982). The claim scope is uncertain since the trademark or trade name

cannot be used properly to identify any particular material or product. A trademark or

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trade name is used to identify a source of goods, and not the goods themselves. Thus, a trademark or trade name does not identify or describe the goods associated with the trademark or trade name. In the present case, the trademark/trade names are used to identify/describe materials and, accordingly, the identification/description is indefinite.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 1 – 5 and 7 – 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graebener (US 2003/0228029 A1) in view of StevensUrethane and Goodfellow.

**Claim 1 and 7:** Graebener discloses an acoustic speaker (planar magnetic speaker) incorporating a planar magnetic transducer including a composite diaphragm formed of a thin film having a metallic material electrical circuit trace pattern on a surface thereof and wherein the diaphragm is mounted within a stator frame such that an active area of the diaphragm having the circuit trace pattern thereon is opposed by at least one magnetic motor driver, the improvement comprising, the film (polyurethane) having a high ultimate elongation such that a ratio of ultimate elongation "A" of the film divided by ultimate elongation of the metallic material (aluminum alloy) of the electrical circuit trace

pattern is generally greater than approximately 40 (Figure 1, Paragraph 23 and 25).

Graebener does not explicitly give the values of ultimate elongation for these materials but StevensUrethane discloses that Urethane film and sheet can elongate as much as 800% and return to its original dimension without significant loss of "memory" (*Under Tensile Strength and Elongation* page 3), and Goodfellow discloses that the elongation at break of an aluminum alloy to have a value of 5.1% (Elongation for Aluminum/Lithium/Copper). Therefore, it would be have been obvious to one of ordinary skill in the art at the time of the invention that the ratio of ultimate elongation of the film divided by the ultimate elongation of the material would be greater than approximately 40 since the mechanical properties and the use of the materials, the polyurethane as a highly flexible material allowing for great displacement of the diaphragm in conjunction with the aluminum alloy as the conductive region of the diaphragm, are well known in the art.

**Claim 2:** The combination of Graebener, StevensUrethane, and Goodfellow discloses the planar magnetic transducer of claim 1, however the combination of Graebener, StevensUrethane, and Goodfellow does not disclose wherein at least one magnetic motor driver is provided on each of opposing sides of the diaphragm within the stator frame. However Graebener does disclose in the prior art section a double ended or push-pull system (Figure 1) where at least one magnetic motor driver is provided on each of opposing sides of the diaphragm within the stator frame (Paragraph 4). It would have been obvious to one of ordinary skill in the art at the time of the invention to

incorporate the composite diaphragm disclosed by Graebener, StevensUrethane, and Goodfellow in a magnetic motor structure as disclosed in the prior art section of Graebener since having a magnetic motor driver on each of opposing sides of the diaphragm provides for an increased energy field resulting in increased output power.

**Claim 3:** The combination of Graebener, StevensUrethane, and Goodfellow discloses the planar magnetic transducer of claim 1 and Graebener further discloses wherein the film is selected from a group of materials consisting of urethane (polyurethane), TEFZEL, TEFLON, NYLON and LYCRA materials (Paragraph 23).

**Claim 4 and 5:** The combination of Graebener, StevensUrethane, and Goodfellow discloses the planar magnetic transducer of claim 1, however the combination of Graebener, StevensUrethane, and Goodfellow does not disclose wherein a configuration of the electrical circuit trace pattern and the ultimate elongation "A" of the film causes the composite diaphragm to move in a piston-like manner within the stator frame when electrical power is supplied to the electrical circuit trace pattern to thereby increase acoustic output and wherein the position of the electrical circuit trace pattern and the ultimate elongation "A" of the film is such as to maintain the electrical circuit trace pattern in alignment with a magnetic field created by the at least one magnetic motor driver to thereby increase acoustic output. Graebener does disclose where the system has flexible diaphragm for converting an electrical signal into a corresponding output, the diaphragm includes a conductive region and a non-conductive region, and

Graebener later discloses where the non-conductive region may be made of polyurethane (Paragraph 14 and 23). Graebener further discloses where the mounting structure holds the diaphragm in a predetermined state of tension and spaces the diaphragm at a predetermined distance from the magnetic structure (Paragraph 14) since the greatest displacement of the diaphragm will occur in the densest portions of the magnetic field proximate to the magnet sources (Paragraph 5). It would have been obvious to one of ordinary skill in the art at the time of the invention that the loudspeaker disclosed by the combination of Graebener, StevensUrethane, and Goodfellow would behave in a piston-like manner which in turn results in increased acoustic output since it is made of the same materials as the applicant and has the same structure with consideration given to the placement of the diaphragm in relation to the magnetic structures.

**Claim 8 and 9:** Graebener discloses a method of improving low frequency performance of a planar magnetic transducer including providing a frame defining a central open area and mounting within the frame a composite diaphragm formed of a thin film (polyurethane) having a metallic material (aluminum alloy) electrical circuit trace pattern applied thereon (Figure 1, Paragraph 23 and 25). Graebener does not explicitly give the values of ultimate elongation for these materials and therefore does not disclose wherein the film has an ultimate elongation which is substantially greater than an ultimate elongation of the metallic material wherein the ultimate elongation of the film is selected to be at least approximately forty times that of the ultimate elongation of the

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metallic material, and does not mention wherein the circuit pattern is applied to the film in such a manner that the composite diaphragm moves with a piston-like motion within the frame when electrical power is supplied to the circuit pattern. StevensUrethane discloses that Urethane film and sheet can elongate as much as 800% and return to its original dimension without significant loss of "memory" (*Under Tensile Strength and Elongation page 3*), and Goodfellow discloses that the elongation at break of an aluminum alloy to have a value of 5.1% (*Elongation for Aluminum/Lithium/Copper*). Therefore, it would be have been obvious to one of ordinary skill in the art at the time of the invention that the ratio of ultimate elongation of the film divided by the ultimate elongation of the material would be greater than approximately 40 since the mechanical properties and the use of the materials, the polyurethane as a highly flexible material allowing for great displacement of the diaphragm in conjunction with the aluminum alloy as the conductive region of the diaphragm, are well known in the art.

11. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graebener (US 2003/0228029 A1) in view of StevensUrethane and Goodfellow, and in further view of Winey (3,674,946).

**Claim 6:** The combination of Graebener, StevensUrethane, and Goodfellow discloses the planar magnetic transducer of claim 1, however the combination of Graebener, StevensUrethane, and Goodfellow does not disclose wherein an ultimate elongation of the composite diaphragm within the frame is non-uniform across its surface to thereby

cause the composite diaphragm to move in a piston-like manner within the stator frame when electrical power is supplied to the electrical circuit trace pattern and thus increases acoustic output. Winey discloses a planar electromagnetic transducer where the diaphragm may be non-uniformly tensioned and stretched so that the tension varies from one end of the transducer to the other. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a non-uniform tensioning of the diaphragm across the surface of the diaphragm within the frame since "as a result of the non-uniform tensioning of the diaphragm, the diaphragm will not have any single set of resonant frequencies, but various portions of the diaphragm will resonate at various frequencies so as to make possible the utilization of these resonant frequencies in improving the output of the transducer at the extremely low audible frequencies" (Column 3 Lines 14 – 28). It also would have been obvious to one of ordinary skill in the art at the time of the invention that the loudspeaker disclosed by the combination of Graebener, StevensUrethane, Goodfellow, and Winey would behave in a piston-like manner which in turn results in increased acoustic output since it is made of the same materials as the applicant and has the same structure.

**Claim 10:** The combination of Graebener, StevensUrethane, and Goodfellow discloses a planar magnetic transducer having improved low frequency performance, the transducer including a frame in which a composite diaphragm is mounted so as to establish an active area within the frame and wherein the composite diaphragm

includes a thin film (polyurethane) having a metallic material (aluminum alloy) electrical circuit trace pattern on a surface thereof (Paragraph 23 and 25), at least one magnetic motor driver mounted with the frame for creating a magnetic field (Figure 1), but does not disclose wherein an ultimate elongation of the active area of the composite diaphragm within the frame is non-uniform across its surface to thereby cause the active area of the composite diaphragm to move in a piston-like manner within the frame when electrical power is supplied to the electrical circuit trace pattern. Winey discloses a planar electromagnetic transducer where the diaphragm may be non-uniformly tensioned and stretched so that the tension varies from one end of the transducer to the other. It would have been obvious to one of ordinary skill in the art at the time of the invention to have a non-uniform tensioning of the diaphragm across the surface of the diaphragm within the frame since "as a result of the non-uniform tensioning of the diaphragm, the diaphragm will not have any single set of resonant frequencies, but various portions of the diaphragm will resonate at various frequencies so as to make possible the utilization of these resonant frequencies in improving the output of the transducer at the extremely low audible frequencies" (Column 3 Lines 14 – 28). It also would have been obvious to one of ordinary skill in the art at the time of the invention that the loudspeaker disclosed by he combination of Graebener, StevensUrethane, Goodfellow, and Winey would behave in a piston-like manner which in turn results in increased acoustic output since it is made of the same materials as the applicant and has the same structure.

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Joseph Saunders whose telephone number is (571) 270-1063. The examiner can normally be reached on Monday - Thursday, 9:00 a.m. - 4:00 p.m., EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571) 272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
JS  
October 11, 2006

  
SINH TRAN  
SUPERVISORY PATENT EXAMINER